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ABSTRACT

The conclusion of recent research on the relationship between students' school curriculum and their opportunities to enter higher education has generally been that curricular differentiation is a further dimension of social stratification, and that it has become a mechanism of effectively maintained inequality, in the sense defined by Lucas. The present analysis uses a unique series of surveys of school leavers in Scotland, covering the whole of the second half of the twentieth century, to study the relationship between curricular breadth in the senior years of secondary school and the chances of entering higher education. Breadth is found to have been long associated especially with entry to the high-status oldest universities, and also with entry to other universities that were founded before the 1990s. However, breadth of study at school and university is not a new dimension of distinction in Scotland, dating rather from the nineteenth century and earlier. Its effect has not grown with expansion, but in general has declined. The conclusion is that this curricular feature has been a mark of cultural or intellectual distinction, not straightforwardly merely a mechanism of stratification.

KEYWORDS

Expansion; curricular breadth; sex; socio-economic status; Scotland

Introduction

There has been a recent growth in research on the relationship between the curriculum which students follow in secondary school and their opportunities in post-school education (Ayalon, 2006; Ayalon & Gamoran, 2000; Iannelli et al., 2016; Dilnot, 2018; Duta et al., 2018; Schührer et al., 2016; Van de Werfhorst et al., 2003; Vidal Rodeiro, 2019). The general finding has been consistent with the concept of effectively maintained inequality (Lucas, 2001). As social inequality in rates of completing full secondary education narrowed, a new form of social inequality emerged between curricular pathways. The highest classes came to be over-represented in those types of curriculum which are most likely to give access to the highest-status universities. These results have come from several countries – Scotland, England, Ireland, Israel, and the USA. Only where the curriculum in secondary school is standardised is the association with social stratification weakened, for example, in Israel and Ireland (Ayalon, 2006; Iannelli et al., 2016).

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Supplemental data for this article can be accessed here.

The caveat about standardisation reminds us that there have been two ways of understanding the social effects of the secondary-school curriculum. The socially stratifying effect was argued by, for example, Bernstein (1971) and Bourdieu and Passeron (1977) to have arisen because the language and content of the high-status subjects were more familiar to the children of high-status families than to others (ideas developed in much subsequent research, such as by Ball (1990) and Reay et al. (2001)). In contrast, there was the effect which policy makers intended when they responded to that stratification by seeking to require all students to follow the same curriculum (Paterson, 2015a; Young, 2007). That kind of curriculum policy was associated in many countries with the ending of selection for secondary school. Scotland, which is the empirical focus of the present paper, provides a particularly clear instance of the aim to use a standard curriculum to reduce social inequality of opportunity (Croxford, 1994; Gamoran, 1996). A common curriculum was introduced in the mid-secondary years from the mid-1980s onwards. The political and cultural rationale drew upon two strands of thinking. One was the international changes of that period. The other was a long-standing perception that Scottish education had valued breadth for many centuries (Gray et al., 1983; Paterson, 2015b), and that part of the purpose of ending selection was to democratise access to this tradition. It was believed in this tradition that breadth at secondary school corresponded to breadth in the initial years of university study. However, although access to a broad curriculum by lower social classes was significantly extended in Scotland in the 1980s, inequality in that respect widened in precisely the manner which Lucas's theory would lead us to expect (Paterson, 2020). At the same time, sex differentiation of the curriculum consistently narrowed.

The analysis reported here uses a unique series of surveys of school leavers in Scotland, covering the second half of the twentieth century, to investigate how the curriculum of the senior years of secondary school related to the chances of entering various kinds of higher education, and how that relationship itself related to sex and to social stratification. The period includes not only the ending of selection for all schools in the public sector, but also the expansion of higher education from one in twenty of school leavers in the early 1950s to one in three in the late-1990s. Although the survey series in effect ended in 1998, that does leave us with data covering half a century of significant reform (as explained below), allowing the data to be used to address large questions relating to the effects of fundamental change. Change after that date was incremental.

The novelty of the analysis is not only to offer a further empirical test of the theory of effectively maintained inequality, but also to ask questions about the survival of historical cultural traditions. Putting it very briefly at the outset, the competing questions are these: to what extent was breadth of attainment at secondary school a mechanism of effectively maintained inequality, evidenced in a growing importance of breadth for entry to the highest-status universities, and to what extent, on the contrary, was breadth an inherited cultural characteristic that was eroded during the shift to mass higher education?

The next section reviews the research literature on the relationship between the secondary-school curriculum and entry to higher education. The third section outlines the data and methods that underpin the analysis in the fourth section. The final section discusses the empirical results in the light of the wider research and of the Scottish tradition.

The secondary-school curriculum and entry to higher education

Iannelli (2013) noted that there had been little research on the connection between the secondary-school curriculum and opportunities after school, previous exceptions being by Ayalon and Gamoran (2000) and Van de Werfhorst et al. (2003). Ayalon (2006, p. 1209) concludes that the highest-status school subjects not only lead to the highest-status post-school courses but also are most likely to be taken by students from the highest-status families. Iannelli et al. (2016) found that, in Scotland, subject choice at school was a strong mediator of social-class inequalities of entry to higher education, especially the oldest universities. Dilnot (2018) reported that, in England, taking high-status subjects at secondary school was associated with increased chances of entry to the highest-rated universities. Similar results were shown by Vidal Rodeiro (2019), Henderson et al. (2019) and Sammons et al. (2015). Van de Werfhorst et al. (2003) and Schührer et al. (2016) concluded that subject choice was a mechanism by which social inequality of entry to higher education was maintained. This conclusion extends to the point of higher-education entry the significance of previous research on the social differentiation of subject choice at secondary school (Boudon, 1974; Gamoran et al., 1997).

These patterns of differentiation can be modified by two features of the school and university systems. One is where subject choice at high school is constrained, as in Ireland (Iannelli et al., 2016). The other is where choice of post-school specialism is postponed until well after university entry, as in the USA (Duta et al., 2018). In both these circumstances, overall attainment at secondary school is relatively a stronger predictor of university entry. Postponing choice has generally been seen as a way of reducing social inequality (Ayalon, 2006).

This situation is what would be expected from the theory of effectively maintained inequality (Lucas, 2001). As higher education has expanded, merely gaining access to it was no longer as strong a marker of status distinction as it used to be. So the expansion diverted a disproportionate number of lower-status students into lower-status institutions in higher education (Iannelli et al., 2011). In systems where subject-choice at the prior stage of secondary school was unconstrained, as in Scotland and the USA, this diversion came about partly through the pattern of choice of secondary-school subjects. The strength of Lucas's theory is that it allows for change in the association between social status and educational outcomes. Furthermore, it allows a distinction to be drawn between what Boudon (1974) called primary and secondary inequality. Primary inequality means overall differences of intelligence, economic resources, and cultural aptitude. Secondary inequality relates to processes that operate among people who have successfully completed a particular stage of education. So secondary inequality might be the means by which inequality is effectively maintained.

Scotland provides a potentially illuminating case study, having experienced curricular reform at secondary school in the 1980s, and a large expansion of entry to higher education in the 1990s (Croxford, 1994; Gamoran, 1996; Tinklin, 2000). The strength of the approach adopted here is that data on school-leaver entrants to higher education in Scotland stretch back to the early 1960s, and so allow these particular episodes of reform and expansion to be set in long-term context.

There were two fundamental policy changes in this period. Between the mid-1960s and the early 1980s, all schools in the public sector became comprehensive (Gray et al., 1983; Paterson, 2003). The ending of selection was followed by the development of a common curriculum at mid-secondary level (Croxford, 1994; Gamoran, 1996). The second policy change was the expansion of higher education, which happened in two main waves (Paterson, 2003). The first wave followed the Robbins report on higher education in 1963 which led to the first new universities in Scotland for four centuries. Scotland had four universities dating from the fifteenth and sixteenth centuries (Anderson, 1983, pp. 1–26). Four new universities were added in the 1960s, three of which were partly based on colleges which dated from the early twentieth century. A few students attended universities outside Scotland (fewer than 1% of school leavers until the mid-1990s, rising slightly to 1.9% in 1998). Alongside these was a large sector of non-university higher education, also mostly dating from existing colleges of technology, teacher-training, art and music. This first wave of institutional change ended in the early 1980s, but rising demand for higher education led to a growth in the size of the non-university sector (Burnhill et al., 1988, pp. 80–1). During the second period of expansion, which started in the late-1980s, the universities and colleges were combined into a single system of higher-education institutions. There remained a large segment of non-degree higher education in local technical colleges, which mostly dated from the period 1950s-70s (Paterson, 2003).

These structural reforms provide a further reason why the Scottish case might give insight into the changing nature of social stratification by means of curricular differentiation. The historical pattern of university education until the 1960s was based on faculty entry rather than entry to a specialised programme, a principle that was the outcome of the mid-nineteenth-century debates about modernising the universities (Anderson, 1983, pp. 253–93; Paterson, 2015c). The principle of faculty entry was a compromise between modernisers who sought to raise the standard of entry and defenders of the tradition in which breadth of study corresponded, in aspiration, to breadth of social recruitment. The compromise entailed shifting the inauguration of breadth into the senior years of the secondary schools which served a more socially extensive clientele than the universities, and where a new leaving certificate (from 1888) was intended to guarantee high standards. This pattern persisted in the four oldest universities until the 1970s, and marked off Scottish university education from the more specialist traditions that developed elsewhere in the UK. Until the 1970s, entry was guaranteed to anyone who attained what was called the 'attestation of fitness' (Withrington, 1992, p. 139), which was the means by which the breadth of school attainment was formally incorporated into decisions about admission. Breadth of study at school then corresponded to breadth of study in the first two years of university, followed by two years of specialist Honours study. Breadth was thus to some extent a cultural rather than a stratifying value, and defending curricular breadth became a focal point of much cultural campaigning in the 1960s and 1970s (Paterson, 2015b).

Gaining access to the rest of higher education was potentially quite different. Neither the new universities of the 1960s, nor the various specialist colleges, replicated the older pattern of faculty entry, using instead the model of specialist programmes that were common in the rest of the UK. In that sense, the growth of these new universities began to erode the historical distinctiveness of Scottish university education. The four oldest

universities also came to adopt this curricular approach by the 1980s. Selection for entry came increasingly to depend on high attainment in a specialist curriculum rather than breadth (Paterson, 2003, pp. 160–4).

So our curricular focus in this paper is on the effects of breadth of study in the senior years of secondary school, because that allows the historical Scottish debate about the curriculum to be related to the recent sociological debates about social stratification. We explain our definition of breadth in the Methods section. It is difficult to disentangle the effects of breadth from the effects of attainment, because having broad attainment necessarily entails also having quite high attainment in a system where, as in Scotland, the main measure of attainment is a count of the number of senior-secondary courses which the student has successfully followed. We attempt to deal with this problem by recording also the quality of students' performance at this level, and, for part of the analysis, by restricting attention to students who entered higher education with the intention of taking a programme in science. For such students, as explained in the Methods section, we can more unambiguously distinguish between the specialist attainment required to gain entry and the cultural value or status distinction associated with breadth of study.

Thus we have three empirical research questions, amplifying the broader questions that were posed at the end of the Introduction above. All of these relate mainly to Boudon's secondary effects, and so for the main part of the analysis we confine attention to students who had some senior-secondary attainment.

(1) Did curricular breadth at school have a statistical effect on entry to higher education?
(2) Did any effect of breadth interact with sex and socio-economic status?
(3) Did any effect of breadth (or interactive effect) change over time?

Each of these questions is asked for entry to the four oldest universities, to the other pre-1990s universities, to other degree-level higher education, and to the non-degree courses.

Methods

Full details of the data and methods are in the online Appendix. The analysis uses data from 14 surveys which are referred to by the date at which their members turned 16: 1952, 1960–2, 1968–70, 1970–2, 1974–6, 1976–8, 1978–80, 1980–2, 1984, 1986, 1988, 1990, 1996, and 1998 (Croxford et al., 2007; Gray et al., 1983; Paterson et al., 2011). As with any survey series which covers a long period, there were variations in design, management and funding. However, managers of the later surveys were conscious of the history, and therefore sought to design them in a way that allowed for continuity (Burnhill et al., 1987). The managing institutions were the Scottish Council for Research in Education (1952 and 1960–2), the Centre for Educational Sociology (1968–70 to 1990), and ScotCen Social Research (1996 and 1998). The funding came mostly from government and its agencies, from the UK Economic and Social Research Council and its predecessor, and research foundations. The management of the survey was always independent of the funders.

We use these surveys as two kinds of series:

(1) For models of the full range of student attainment, we can use 1952 and 1974–6 to 1998 (Table 1 and Table A2 (online Appendix), and the associated graphs).
(2) The surveys 1960–2 to 1970–2 surveyed only people who had successfully taken at least one senior-secondary course, but, because entry to university from school required students to take such courses, this is sufficient for the analysis here. So this second series is confined to such students, 1960–2 to 1998, omitting the 1952 survey because of inadequate sample size (Tables 2 to 4 and Tables A2 to A4, and associated graphs).

We model students' entry to the various sectors of higher education within about a year of leaving school.

School attainment is measured as awards in the Higher Grade examinations, the legacy of the late-nineteenth-century reforms (referred to colloquially as 'Highers'). For the first series we use a count of these. For the second series above, we can measure both the number and the quality of attainment as

(number of A-C awards) + 0.5x(number of A awards)

In each year, the mean of this measure in this second series is approximately 4, with a standard deviation of approximately 2.

We include an indicator of whether or not the sample member followed a broad curriculum at school. Breadth is defined to be having a Higher award in English, mathematics, a natural science, and at least one of a language, a social subject (such as history or geography) and an aesthetic subject (such as music or art). In modelling entry to science, technology or medicine, we also include indicators of whether or not the respondent had an award in mathematics, an award in at least two senior-secondary courses in natural science, and at least one award at level A in mathematics or any science (Paterson, 2020).

A variable recording sex is available in all surveys; in each survey, around half the sample was female. Social class is the Registrar General social class of the father, grouped for the analysis into I, II; III; IV, V; other. Parental education was recorded in all but the 1960–2 survey as the age at which each parent left full-time education (15 or younger; 16; 17 or older; or unknown). The 1960–2 survey did not record any information on parental education, but, in order to be able to use this variable with the whole series, we imputed the modal value of parental education for each of the six categories of father's class, using the MRC National Study of Health and Development as explained in the online Appendix.

The proportion of school leavers who had parents who were educated beyond the minimum grew: for example, the proportion with at least one parent educated beyond age 17 rose form 4% to 34%, most of that change happening after the mid-1980s. The social-class distribution also shifted over time to the higher categories – for example, from 12% in classes I and II in 1952 to 30% in 1998.

Because all the outcomes are dichotomous, we model them by logistic regression. In recording the destination, we distinguish among four categories of higher education, based on the history and policy developments outlined above:

(1) the four old universities;
(2) the four universities created in the 1960s (or their institutional predecessors in 1962), along with pre-1990s universities outside Scotland;
(3) degree courses in institutions other than the universities in (1) and (2);
(4) non-degree courses and professional courses, which are mainly courses leading to a Higher National Certificate or Diploma.

Statistical models (1) compare, across the whole sample, entering and not entering the old universities. Models (2) are restricted to people who did not enter the old universities, and compare entering and not entering these other pre-1990s universities. Models (3) analogously restrict to people who did not enter any university in categories (1) or (2), and Models (4) are restricted to people who did not enter any degree course. This approach recognises the ordered hierarchy of institutions.

The modelling was done in R using the function 'svyglm' in the 'survey' package. This allowed weights to be taken into account. We show detailed results by means of predicted proportions entering the sectors, in order to allow valid comparison of models for different sectors. (Comparing logistic regression coefficients for different models is not valid (Mood, 2010).) To avoid excessive complexity of predicted proportions, the graphs show three levels of socio-economic status corresponding to the three grouped levels of class in the models and the modal level of parental education for that class group in that year.

Analysis

Table 1 shows the growth of participation by school leavers in higher education from the early 1950s to the end of the century. The overall rate of entry rose from one in eight to over one in three. The old universities took a stable share of all school leavers from the 1950s to the late 1980s, after which their share doubled to 10%. The other pre-1990s universities had a similar trajectory between the 1960s and the 1990s, but with a share about one fifth less than the old universities. The growth in non-degree professional courses was quite similar to that in the old universities (6% to 9%). The sector with the largest growth was degree courses outside the pre-1990s universities (2% to 12%).

Entry to sectors of higher education: social disparities across the whole range of attainment

Although our main attention here is on the secondary effects, conditional on students' entering courses in the senior years of the secondary school, we also analyse the effects of school attainment, sex and socio-economic status on the overall expansion shown in Table 1. We do this in order to be able to see later whether these primary effects are structured differently from the secondary effects. Table A1 (online Appendix) summarises the models. The table shows that, for all four sectors, the largest effects are for year and attainment. The year:attainment interactive effect is third strongest for the other pre-1990s universities and the non-degree professional courses. For the old universities, it has a similar strength to the effect of parental education, and for the degree courses outside

Table 1. Entry to sectors of higher education, 1952–98.

Percentage	Old universities	Other pre-1990s universities	Degree courses not in pre-1990s universities†	Non-degree and professional courses‡	All sectors§	Sample size (=100%)
Year when respondent was aged 16	1	2	3	4	5	
1952	4	-	2	6	12	1,158
1974–6	4	3	2	4	13	16,376
1976–8	5	3	2	5	14	8,823
1978–80	4	3	2	4	14	21,506
1980–2	4	2	3	5	15	7,149
1984	4	3	5	6	19	3,954
1986	5	4	5	9	23	4,009
1988	7	4	8	9	28	3,525
1990	8	7	9	10	33	2,708
1996	9	8	12	10	39	2,380
1998	10	8	12	9	38	4,751

Sources: Percentages weighted; sample sizes unweighted.

†*Degree courses in any institution that, until the 1990s, was a non-university higher-education college. In 1952, 'degrees' include professional qualifications for high-status professions.*

‡ *Non-degree higher-education courses in colleges not included in the first three columns. In 1952, includes nursing and non-graduate professions.*

Institutions outside Scotland are included in columns 2–5 (as proportions of all entrants in column 5: 0.03 or lower until 1984; 0.04 to 1990; 0.05 in 1996–8).

§ *The 'all sectors' column is the sum of the others, apart from rounding error.*

the pre-1990s universities it comes behind only the changing effects of class and sex. So, overall, the table shows that what mainly mattered in shaping participation was expansion, school attainment, and the changing effects of attainment during the expansion.

The nature of the changes is shown in Figure 1 (for the old universities). The three values of attainment are the mean plus and minus 0.5 standard deviations. The greatest growth after the 1970s was for people with above-average attainment (top panels), most notably for high SES students (dashed lines). There was a sex difference in this growth. For high-SES males, the growth between 1952–78 and 1996–8 was 9.5 points; the analogous growth for high-SES females was 13.7 (s.e. of difference 4.2; $p = 0.09$). Looked at differently, there was a growth of socio-economic inequality at high attainment. For males, the difference of high SES minus low SES grew from 1.3 points to 7.6 points (s.e. 0.02; $p = 0.002$). For females, this SES gap grew from 1.6 to 12.6 (s.e. 0.02; $p < 0.001$). Inequality also rose at average and low attainment, but less.

The patterns for the other pre-1990s universities and for degrees outside these two university sectors (not shown) were similar in all these respects – greater growth among females, and greater inequality, especially at high attainment. But entry to non-degree courses was different, as Figure 2 shows. These students might be thought of as people who just missed out on entering degree courses. Socio-economic inequality of entry fell in the 1990s, essentially because the high-SES students had taken advantage of the expansion of old and new universities (Iannelli et al., 2011), and so were less likely to enter non-degree courses. Between 1990 and 1998, the difference between high-SES and low-SES students fell from 20% to 0.65% among males (s.e. 10; $p = 0.06$), and from 13% to –0.52% among females (s.e. 8; $p = 0.08$). Although this process has been described as the diversion of low-SES students into low-status colleges, the longer-term perspective shown in the graphs suggests that it might be more appositely described as a new aversion by high-SES students towards these colleges when new opportunities to enter degree courses opened up.

These results tell us about overall participation by the whole cohort. The rest of the analysis concentrates on students who have passed at least one Higher. The focus is on our main topic, curricular breadth, but before we get to that we report models of secondary effects that are analogous to the models in Table A1 (online Appendix).

Entry to sectors of higher education: social disparities across students with at least one senior-secondary course

Table 2 describes the changing rates of entry to higher education by these students. The proportion of the age group passing at least one Higher is shown in the first column, for reference. Proceeding to higher education did not become the norm until the mid-1980s, but that stability concealed significant shifts among sectors. The pre-1990s universities never took more than about one third of these school leavers, a proportion that fell to a quarter in the early 1980s. The strongest growth was in degree courses outside these universities, from 10% or less in the 1960s and 1970s to a fifth in the 1990s. Non-degree courses rose in the late 1980s, but fell in the 1990s to the level they had been at in the 1970s.

Table A2 (online Appendix) summarises models which relate these changes to school attainment, sex, and socio-economic status. The importance of year, attainment and their interactive effect is similar to Table A1: the interactive effect of year and attainment is

Table 2. Entry to sectors of higher education, among people who had passed at least 1 higher grade at school, 1962–98.

Percentage	Proportion reaching this level[†]	Old universities	Other pre-1990s universities	Degree courses not in pre-1990s universities	Non-degree and professional courses	All sectors	Sample size for all but first column (=100%)
Year when respondent was aged 16							
1960–2	15	30	6	1	5	42	9,171
1968–70	25	24	11	2	12	49	2,482
1970–2	27	21	10	3	9	42	2,779
1974–6	27	19	10	7	16	53	7,207
1976–8	26	18	11	7	16	53	1,775
1978–80	27	16	11	8	13	48	6,795
1980–2	27	14	9	11	15	48	2,531
1984	32	14	10	14	17	55	1,760
1986	33	16	11	15	22	64	1,918
1988	37	17	12	22	18	69	1,847
1990	41	19	15	20	20	74	1,582
1996	50	18	15	23	13	69	1,549
1998	52	19	16	21	12	68	3,163

Percentages weighted; sample sizes unweighted.
For definition of sectors, see footnote to Table 1, and text. In 1960–2, 'Other pre-1990s universities' includes those colleges which became universities in the 1960s.
[†] *Proportion of school leavers passing at least one Higher. Sources: Scottish Education Department (1971: 28; 1973: 29);* Gray et al. (1983, p. 205); *surveys described in Methods section.*

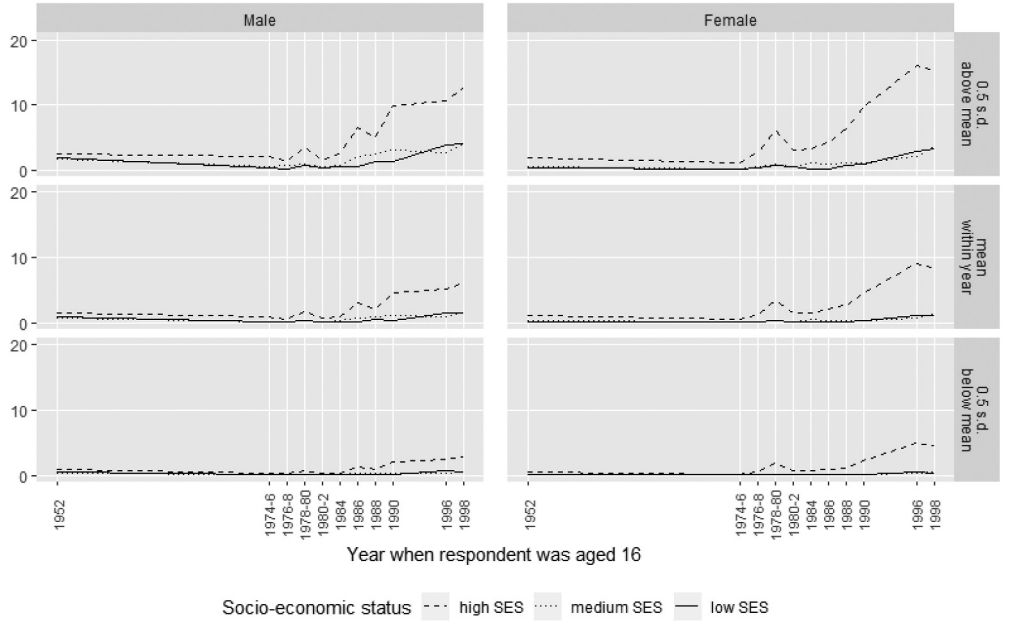

Figure 1. Percentage entering old universities, by attainment, sex and socio-economic status.
Notes: predicted values from Model 1 in Table A1. Mean standard error of individual predicted percentages: 0.7. For comparisons of groups of predictions, see text.

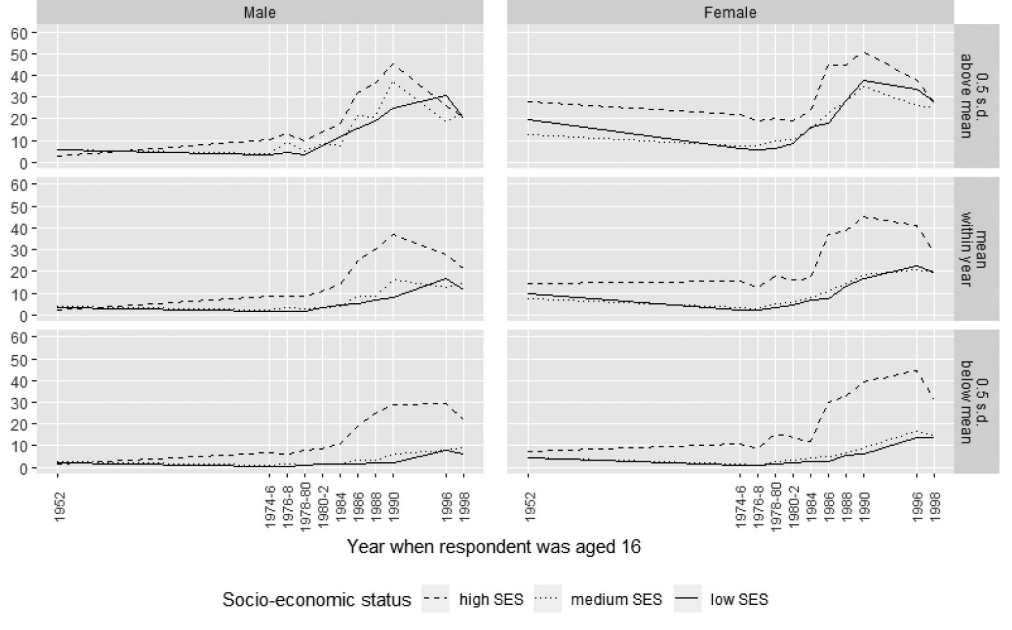

Figure 2. Percentage entering non-degree higher education among those who did not enter degree-level higher education, by attainment, sex and socio-economic status.
Notes: Predicted values from Model 4 in Table A1. Mean standard error of individual predicted percentages: 3. For comparisons of groups of predictions, see text.

third strongest in the columns for old universities and for non-degree courses, is similar to the effect of sex for the other pre-1990s universities, and, for degree courses outside these universities, comes behind only the changing effects of sex and class. The nature of the changing effects of attainment, sex and socio-economic status is shown in Figures 3 and 4. Figure 3 shows entry to the old universities. For simplicity, attainment is labelled in the graph as the numbers of Highers, but (as explained in the Methods section) the attainment variable in the models combines that count with the number of A awards. The fall in entry that occurred in the early 1980s appears here to be merely the continuation of a trend that had been present since the 1960s: as overall participation in higher education rose, the competition for entry to the oldest institutions became fiercer. Even at the highest level of attainment shown here, there was, in every year, a further (secondary) effect of socio-economic status: the line for high-SES students is above the other two SES lines. Moreover, for females that secondary effect may have widened over time at the highest level of attainment: the gap high-SES minus low-SES was 6.3 in 1962 and 13.9 in 1996–98 (s.e. of the difference 4.6; p = 0.097). Nevertheless, there was no difference between low-SES and medium-SES students in any year at any level of attainment.

The pattern was similar for the other pre-1990s universities, though with more random variation from year to year and with no fall in the rates of entry for low and medium attainment (which were already very low). Thus the relative contraction of both of these

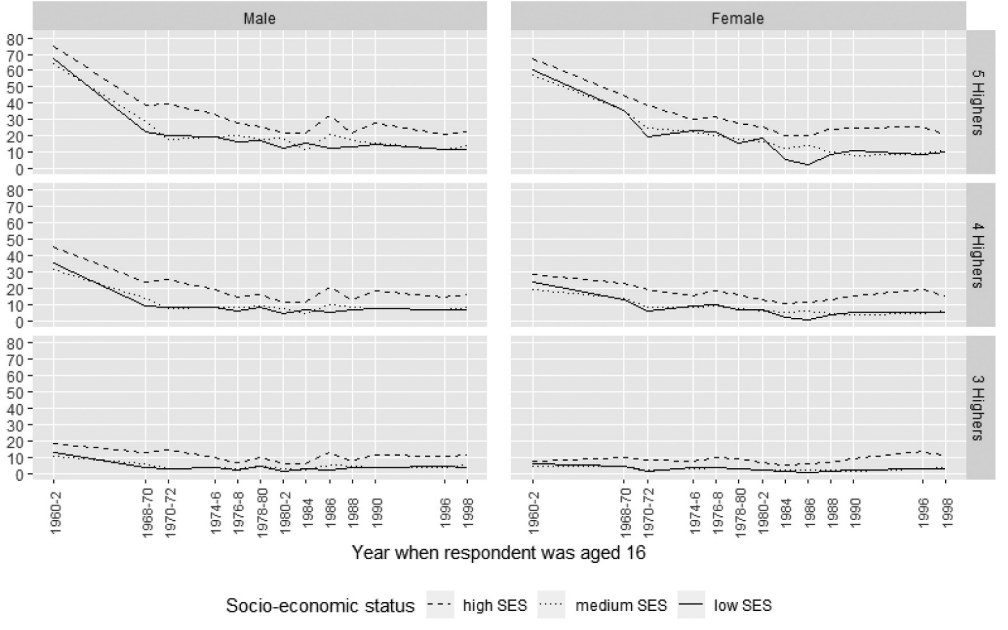

Figure 3. Predicted percentage entering old universities, by attainment, sex and socio-economic status, among students with one or more higher grades.
Notes: predicted values from Model 1 in Table A2. The categories of attainment are approximate: see text. Mean standard error of individual predicted percentages: 2. For comparisons of groups of predictions, see text.

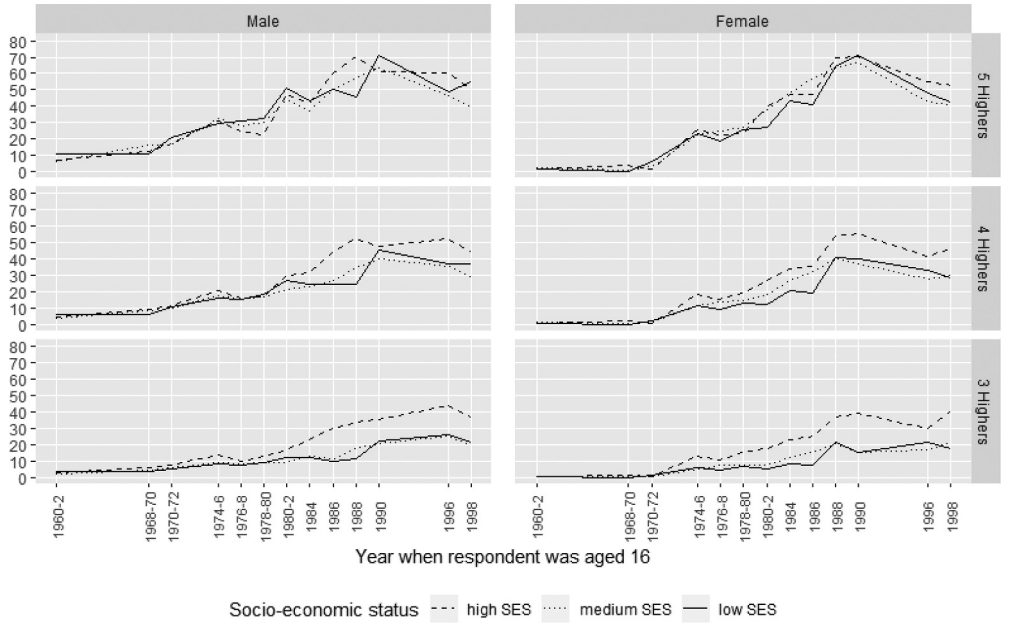

Figure 4. Percentage entering degree courses, by attainment, sex and socio-economic status, among students with one or more Higher Grades who did not enter pre-1990s universities.
Notes: predicted values from Model 3 in Table A2.The categories of attainment are approximate: see text. Mean standard error of individual predicted percentages: 4. For comparisons of groups of predictions, see text.

university sectors was mainly a matter for students with above-average school attainment. Figure 4 shows where the displaced students went – into degree courses in other higher education colleges. Participation among this subset of students rose for each class and sex at each level of attainment. It did not fall at high attainment until the 1990s, when new opportunities opened up in the newly expanding two older sectors. There were no sex or SES differences in these trends among the highest-attaining students in Figure 4, but at lower levels of attainment participation by high-SES students rose faster than in the other SES groups. Thus inequality widened in entry to these degree-level courses outside the older universities. For average-attaining males, the gap between high-SES and low-SES rose by 12.9 points (s.e. 6; $p = 0.04$). For females, the rise was 13.0 (s.e. 5; $p = 0.009$). The pattern of inequality for non-degree courses was similar, though with more random variation.

Entry to sectors of higher education: effects of breadth

The question is now whether curricular breadth adds explanatory power to this analysis of secondary effects. Here we restrict attention to students who had successfully completed at least four senior-secondary courses, because no-one with fewer such courses could have had the breadth of attainment as we have defined it. The sample sizes in most years were around one half of those shown in Table 2, though closer to four fifths in 1962 and two thirds in the 1990s. Table A3 (online Appendix) shows the statistical effects of the terms relating to breadth. Breadth did have an additional effect, and it mostly operated

Table 3. Entry rates to old universities: difference associated with curricular breadth students with mean† attainment only.

	1962–72	1976–88	1990–98
Male			
high SES	16 (3.9) <0.001	6.5 (2.1) 0.002	5.3 (3.2) 0.098
medium SES	16 (3.0) <0.001	4.4 (1.8) 0.017	5.3 (3.1) 0.084
low SES	11 (3.1) 0.001	5.4 (2.0) 0.008	4.7 (2.7) 0.076
Female			
high SES	8.2 (4.1) 0.045	4.8 (2.0) 0.017	7.4 (3.9) 0.057
medium SES	9.0 (3.5) 0.011	2.9 (1.5) 0.058	4.4 (2.1) 0.035
low SES	4.5 (3.7) 0.224	3.7 (1.9) 0.054	6.2 (3.4) 0.067

† *Mean among students who passed at least one Higher.*

Cells show percentage-point difference between students with and without breadth (predicted from model 1 in Table A3), standard error of difference, and p-value for the difference.

Table 4. Entry rates to other pre-1990s universities: difference associated with curricular breadth students with mean† attainment only who did not enter old universities.

	1962–72	1976–88	1990–98
Male			
high SES	2.8 (4.8) 0.562	6.3 (2.1) 0.002	10 (5.2) 0.053
medium SES	7.4 (4.0) 0.066	4.1 (1.7) 0.013	9.0 (4.4) 0.040
low SES	3.2 (4.0) 0.43	3.9 (2.2) 0.075	4.9 (3.1) 0.110
Female			
high SES	16 (4.9) 0.001	6.1 (2.2) 0.006	9.7 (3.9) 0.012
medium SES	12 (3.8) 0.001	2.8 (1.2) 0.023	9.3 (3.7) 0.011
low SES	11 (5.4) 0.047	2.7 (1.5) 0.079	7.4 (3.6) 0.037

† *Mean among students who passed at least one Higher.*

Cells show percentage-point difference between students with and without breadth (predicted from model 1 in Table A3), standard error of difference, and p-value for the difference.

Table 5. Summary of changing effects of breadth on entry to higher education between the 1960s and the 1990s.

Sector	Male	Female
Old universities	Positive Declining	Positive Declining to 1980s, then growing
Other pre-1990s universities	Positive Growing	Positive Declining to 1980s, then growing
Degree courses not in pre-1990s old or 1960s universities	For low-SES only: positive in 1980s; negative in 1990s	Positive 1980s-1990s
Non-degree and professional courses	Negative in 1990s	No effect

Notes:The summary is for average attainment among students who passed at least one senior-secondary course. Tables 4, 5and , and discussion in text.

differently at different levels of attainment. The effect of breadth varied by sex; it also varied by socio-economic status for entry to degree courses outside the pre-1990s universities.

These results are illustrated in detail for the old universities in Table 3 and for the 1960s universities in Table 4. The results for all sectors are summarised in Table 5. In Table 3, the effect is positive, but weakening over time for males and weakening then strengthening for females. So, for the old universities, breadth seemed to provide a distinct advantage in gaining entry throughout the whole period, but

declining for male students towards the end. What is, nevertheless, striking is the lack of strong SES differentiation. Breadth conferred almost as great an advantage on low-SES students as on others. Of course, there were strong SES effects on attaining breadth in the first place (Gray et al., 1983; Paterson, 2020). But, in the operation at what Boudon calls this secondary point of selection, the oldest Scottish institutions showed almost no further such distinctions.

For the other pre-1990s universities (Table 4), the pattern of change was quite different from the old universities: the effect of breadth was positive for females in the 1960s and the early 1970s, generally narrowed up to the late-1980s, and then widened again in the 1990s. For males, the effect of breadth mostly grew steadily.

The pattern for degree courses outside in the 1990s universities was more complex, as summarised in Table 5. There was no effect of breadth in the 1960s and 1970s, and for high-SES and medium-SES males this absence persisted until the 1990s. But between the 1980s and the 1990s, low-SES males went from having a positive effect of breadth to having a negative effect. For female students, the effect of breadth became positive by the 1990s, which is similar to the trend for the 1960s universities (as in Table 4). The negative effect of breadth among men was observed also for non-degree courses, where there was no effect at all for women.

From the summary in Table 5, we may say therefore that breadth was more than merely a dimension by which (in Lucas's terms) inequality was effectively maintained in response to rising participation in the 1990s. Although the growing importance of breadth between the 1980s and the 1990s for entering the 1960s universities would be consistent with that theory, as would the growing importance of breadth for female students entering the 1990s universities, a straightforward interpretation along these lines is not consistent with the advantage of curricular breadth as long ago as the 1960s and 1970s for the 1960s and old universities, the declining effect of breadth in the latter, and the sex difference in relation to the 1990s universities. In particular, the positive effect of breadth for all SES groups in entering the old and the 1960s universities during the 1990s expansion is a direct contradiction of any claim that breadth disproportionately benefited high-SES groups in entering high-status universities.

Entry to science in higher education: effects of breadth

Our final test concentrates the focus even further, by looking only at entry to courses in science, technology or medicine (which we refer to simply as science). For these courses, we can introduce tight controls for relevant attainment at school – in natural sciences and in mathematics. If a prospective science student is very highly qualified in these respects, then any effect of breadth is likely to be an indicator of some wider characteristics. If these characteristics relate to social status, we would expect the importance of breadth to increase. If they relate to something more intrinsically cultural, we would expect no particular trend in the importance of breadth.

The relevant parts of the statistical models are shown in Table A4 (online Appendix). As well as the demographic variables and general attainment (and their interactive effects) that we have considered in previous models, these models also control for scientific and mathematical attainment at school (as explained in the

Methods section). The table shows that, even beyond these controls, breadth continued to have an effect on entry, and that the effect of breadth varied over time and by general attainment.

Because over 90% of the restricted sample (of people with four or more Highers) have also successfully completed a course in English, breadth for students with scientific and mathematical attainment means in effect having completed courses in humanities or social science. In all but one respect, the conclusions for entry to science by such students were broadly the same as those summarised for all fields of study in Table 5. The exception was for female entrants to the old universities, where any growth in the effects of breadth in the 1990s was confined to low-SES students. So the conclusion from analysis of entry to science in higher education is even more emphatically that breadth did not disproportionately benefit high-SES students entering old universities during the 1990s expansion.

Conclusion

The main strengths of the analysis reported here is in the length of the times series of surveys which it has used, covering half a century, two phases of higher-education expansion, and radical changes in the structure and curriculum of secondary schools. The sheer extent of change in this period is the main reason that the ending of the survey series in 1998 is not as serious a restriction for the purposes of illustrating theory as it would have been if any of these periods of expansion had been missed. The surveys allowed detailed analysis of sex and socio-economic differences in students' curricula at school and higher education, and in the type of higher-education institution which they entered. No other data source, in any country, allows attention to these questions over such a long period of time. The main limitation of the analysis is that the data are restricted to school leavers, with no evidence relating to other means of access, or to progress within higher-education courses.

Our main research questions were about the role of curricular breadth at school in access to higher education. This is what Boudon calls a secondary effect. The primary effects relate to school attainment, sex and socio-economic status, which are the main influences on entry. The question is whether, over and above these factors, breadth also influences participation.

Before getting to that main question, the analysis established that there was variation among the higher-education sectors in the patterns of participation, with attainment, sex and socio-economic status having different relationships to entry for different kinds of institution. For the pre-1990s universities, and the higher-education colleges that became universities in the 1990s, the expansion was strongest among people with above-average attainment, and who were of high socio-economic status. That was not so for non-degree courses: socio-economic inequality there fell because high-SES students became less likely to enter.

The survey series then also showed that the social differentiation of secondary effects was similar to these primary effects. These are the influences on participation among students who successfully completed at least one senior secondary course. The rise in overall participation increased competition to enter the older universities,

which thus became more differentiated than previously from newer institutions. For entry to the old universities, even at high attainment there was a remaining small effect of socio-economic status, perhaps larger for females than for males. The contraction of the pre-1990s universities in the early 1980s pushed some students with above-average attainment into the colleges, especially high-SES students. The net effect was that the overall expansion between the 1970s and the early 1990s disproportionately benefited high-SES students who had middling or low attainment in senior secondary school. Only in the very large further expansion in the later 1990s did other groups benefit.

These patterns of expansion and differentiation were the context for the analysis of the effects of curricular breadth. For entry to the pre-1990s universities, breadth at secondary school had a positive effect on the chances of entry over and above that of attainment. On the whole, this breadth effect was similar for males and females, and for each socio-economic group. Although these are secondary effects, operating among people on the threshold of higher-education entry, the findings do not contradict the cultural importance of breadth as it has operated within the dominant Scottish tradition. That was always what might now be called a secondary effect, a preference for the broadly educated above the specialist, but never doubting the importance of high attainment for competitive entry to university. The findings relating to this tradition of higher education are the main conclusions of the analysis, and the most important feature in that respect has been the general reduction in the importance of curricular breadth in an era of massive expansion.

Therefore there are two answers to the over-arching research question that was posed at the end of the Introduction, corresponding to two quite different interpretations of the social significance of breadth. One answer is a confirmation of the theory of effectively maintained inequality. Breadth was more strongly associated with entry to the highest-status universities after the massive expansion in the 1990s than it had been in the 1980s. Although that association did happen at all levels of SES, the SES disparities in breadth of attainment at secondary school (as shown elsewhere (Paterson, 2020)) ensured that this pattern reinforced high-SES dominance of the older institutions.

But the other answer shows the opposite trajectory when looked at in longer-term perspective. Compared to the 1960s and early 1970s, breadth became less strongly associated with the older universities. This change was particularly stark for the four oldest universities, the defining feature of which since the late-nineteenth century had been the affinity between breadth at school and breadth of university study. Although achieving breadth at school was socially differentiated, the association of breadth with entry to these oldest universities was not. This is a specifically Scottish instance of Boudon's distinction between socio-economic effects operating at a primary level (attaining breadth at school) and at a secondary level (what opportunity the student has with that breadth once it is attained). That is the sense in which the affinity between breadth and the university traditions may be described as marking breadth as a cultural accomplishment, not merely as a marker of status.

We noted at the beginning that the effects of secondary-school curricula on entry to higher education have recently been studied in many countries. The important work cited earlier has tended to view curricular differentiation as a new dimension of social stratification, with Lucas's theory of effectively maintained inequality as an appropriate explanation. In many circumstances that is the best way of interpreting the findings. But in some

education systems, curricular breadth has been also a cultural characteristic, valued intrinsically beyond a certain level of attainment, and not merely as an expression of social status. Scotland is such a case. Our findings suggest that this distinctive tradition of breadth, far from being strengthened as a dimension of stratification by expansion, has been eroded in its significance for all social groups.

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Ethics statement

The paper is entirely based on secondary data. The participants in the surveys gave their informed consent, as detailed in the original reports of the surveys noted in the Methods section. The analysis on which the paper is based was given ethical clearance by the research ethics committee of the School of Social and Political Science, Edinburgh University, on 27 March 2017.

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